# AMENDMENT No. 1 AUGUST 2023
# TO
# IS 15769 : 2008 FLUX CORED (TUBULAR) ELECTRODES FOR GAS SHIELDED AND SELF-SHIELDED METAL WELDING OF CARBON OR CARBON-MANGANESE STEEL

(*First cover page*, *English title*) — Substitute the following for the existing:

'**Flux Cored (Tubular) Electrodes for Gas Shielded and Self-Shielded Metal Arc Welding of Carbon or Carbon-Manganese Steel**'.

(*First cover page and Page* 1, *English title*) — Substitute the following for the existing:

'FLUX CORED (TUBULAR) ELECTRODES FOR GAS SHIELDED AND SELF-SHIELDED METAL ARC WELDING OF CARBON OR CARBON-MANGANESE STEEL'.

(*Page* 1, *clause* **2**) — Substitute the following for the existing:

**'2 REFERENCES**

The standards listed below contain provisions, which through reference in this text constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated below.

| *IS No.* | *Title* |
|---|---|
| IS 1608 (Part 1) : 2022/ISO 6892-1 : 2019 | Metallic materials — Tensile testing: Part 1 Method of test at room temperature |
| IS 1757 (Part 1) : 2020/ISO 148-1 : 2016 | Metallic Materials — Charpy pendulum impact test: Part 1 Test method (*fourth revision*) |
| IS 2002 : 2009 | Steel plate for pressure vessel for intermediate and high temperature service including boilers (*third revision*) |
| IS 2062 : 2011 | Hot rolled medium and high tensile structural steel — Specification (*seventh revision*) |
| IS 11802 : 1986 | Methods for determination of diffusible hydrogen content of deposited weld metal from covered electrodes in welding mild and low alloy steels |
| IS 13851 : 1993 | Storage and redrying of covered electrodes before use — Recommendations |

(*Page* 3, *Table* 1) — Substitute the following for the existing:

**Table 1 Designation of Strength characteristics**

(*Clause* 3.3 and 3.4)

| **Sl No.** (1) | **Designation Digit** (2) | **Ultimate Tensile Strength** N/mm$^2$ (3) | **Yield Strength** *Min* N/mm$^2$ (4) | **Elongation Percent** *Min* on 5.65√S (5) |
|---|---|---|---|---|
| i) | 4 | 410 - 510 | 330 | 22 |
| ii) | 5 | 510 - 670 | 360 | 20 |

**Price Group 2**

(*Page* 6, *Table* 10) — Substitute the following for the existing:

**Table 10 Dimensions and Maximum Weight of Spools**
(*Clause* 4.4.3)

| **Sl No.** | **Overall Diameter A** mm | **Overall Width B** mm | **Inner Diameter C** mm | **Distance Between Axes D** mm | **Driving Hole Diameter E** mm | **Net Weight of wire/ electrode,** *Max* kg |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| i) | 100 ± 2 | $45^{+0}_{-2}$ | $16^{+1}_{-0}$ | - | - | 0.8 |
| ii) | 200 ± 3 | $55^{+0}_{-3}$ | $50.5^{+2.5}_{-0}$ | 44.5 ± 0.5 | $10^{+1}_{-0}$ | 5 |
| iii) | 275 ± 5 | 103 ± 5 | $50.5^{+2.5}_{-0}$ | 44.5 ± 0.5 | $10^{+1}_{-0}$ | 15 |
| iii) | 300 ± 5 | 103 ± 5 | $50.5^{+2.5}_{-0}$ | 44.5 ± 0.5 | $10^{+1}_{-0}$ | 15 |
| iv) | 350 ± 5 | 0.30 | $50.5^{+2.5}_{-0}$ | 44.5 ± 0.5 | $10^{+1}_{-0}$ | 25 |
| v) | 550 ± 10 | 300 ± 5 | $40.5^{+1}_{-0}$ | $D_1 = 25 + 1$<br>$D_2 = 35 + 1$ | 17 ± 1 | 100 |
| vi) | 600 ± 10 | 340 ± 5 | $40.5^{+1}_{-0}$ | $D_1 = 25 + 1$<br>$D_2 = 35 + 1$ | 17 ± 1 | 150 |
| vii) | 760 ± 10 | $340^{+10}_{-1}$ | $40.5^{+1}_{-0}$ | $D_1 = 25 + 1$<br>$D_2 = 35 + 1$ | 17 ± 1 | 300 |

NOTE — Net weight of wire/electrode is only the weight of wire wound on spool. It is not the sum of weight of spool (on which wire/electrode is wound) and wire/electrode.

(*Page* 9, *clause* **5.1.2.2**) — Substitute the following for the existing clause:

‘**5.1.2.2** The test assembly shall be prepared and welded, as shown in Fig. 5 using the welding conditions as recommended by manufacturers. After tack welding the plates at each end, the test assembly shall be welded in the flat position with one bead on each side. Welding shall begin with the assembly at room temperature (20 °C *Min*). When the weld bead has been completed on one side, the assembly shall be turned over and another bead shall be deposited on the reverse side, as shown in Fig. 5. This sequence shall not be interrupted. The electrode size shall be 1.2 mm, 1.6 mm or 2.4 mm in diameter.’

(*Page* 13, *clause* **7.1**) — Delete.

(*Page* 17, *Table* 15) — Substitute the following for the existing Table:

**Table 15 Chemical Composition Requirement**
(*Clause* 5.8.2)

| **Sl No.** (1) | **Classification** (2) | **C %** (3) | **Mn %** (4) | **Si %** (5) | **P %** (6) | **S %** (7) | **Ni %** (8) | **Cr %** (9) | **Mo %** (10) | **V %** (11) | **Al %** (12) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| i) | ET4XXXC9<br>ET4XXXM9 | 0.15 | 1.75 | 0.90 | 0.030 | 0.030 | 0.50 | 0.20 | 0.30 | 0.08 | - |
| ii) | ET4XXXN9 | 0.30 | 1.75 | 0.90 | 0.030 | 0.030 | 0.50 | 0.20 | 0.30 | 0.08 | 2.0 |
| iii) | ET5XXXC9<br>ET5XXXM9 | 0.15 | 2.0 | 0.90 | 0.030 | 0.030 | 0.50 | 0.20 | 0.30 | 0.08 | - |
| iv) | ET5XXXXN9 | 0.30 | 2.0 | 0.90 | 0.030 | 0.030 | 0.50 | 0.20 | 0.30 | 0.08 | 2.0 |

NOTES
**1** Single values are maximum.
**2** Since Ni, Cr, Mo and V are not intentionally added, the total of these elements Ni % + Cr % + Mo % + V % shall not exceed 0.70 %.

(*Page* 17, *clause* **8.1.1**) — Substitute the following for the existing clause:

**8.1.1** Each bundle or carton of electrodes shall be clearly marked with the following information:

a) Classification (*see* **3**);
b) Indicating the source of manufacture;
c) Trade name and brief description of the electrodes;
d) Size and quantity of electrodes;
e) Batch number;
f) Recommended current range, polarity and shielding gas;
g) Date of manufacture; and
h) A cautionary note on safety during welding.

(*Page* 17, *clause* **8.1.2**) — Substitute the following for the existing clause:

‘**8.1.2 BIS Certification Marking**

The product(s) conforming to the requirements of this standard may be certified as per the conformity assessment schemes under the provisions of the *Bureau of Indian Standards Act*, 2016 and the Rules and Regulations framed thereunder, and the products may be marked with the Standard Mark.’

(*Page* 19) — Substitute the following for the existing clause:

**Examples of Electrode Classifications:**

Flux cored (tubular) electrodes with rutile cored ingredients for metal arc welding of multi-pass joints in the flat and horizontal/vertical positions without shielding gas. The electrode is designed to give 15 ml diffusible hydrogen content per 100 g of weld metal deposit. The test results showed that the ultimate tensile strength of weld deposit was 450 N/mm$^2$ with 350 N/mm$^2$ yield strength and 24 percent elongation. The average impact value obtained was 30 J at – 20 °C. The classification of the electrode is therefore ET 420RN9H15.

(MTD 11)

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